REMARKS

In the Final Office Action dated 11-28-05, the examiner rejected claims 1-2, 5-11, 14-22, and 25-30 under 35 USC § 102(e) as allegedly being anticipated by Luick (US Pub. 2003/0229662).

Applicant amends each of the independent claims 1, 10, 19, and 30 to overcome this rejection. The applicant adds new claims 33, 34, 35, and 36 to correspond to original claims 4, 13, 24, and 32, respectively, which were previously canceled. The applicant amends dependent claims 5-9, 14-18, and 25-29 to provide for proper antecedent basis.

Luick discloses with reference to FIG. 6 in paragraph [0056]: "In FIG. 6, sensors 41A and 41B are implemented as ring oscillators ring oscillator 1 and ring oscillator 2, constructed with Complementary Metal Oxide Semiconductor (CMOS) logic circuits such as static inverters, static NANDs, and static NORs. CMOS circuits slow down as temperature increases. Sensor 41A is physically near FPMADD 18 and therefore will have a frequency that decreases **relative to** sensor 41B, which is further away, as FPMADD 18 becomes hotter. The **frequency difference** detector embodiment of TDC 42 will respond to a sufficient change in sensor 41A's frequency **relative to** the frequency of sensor 41B and change the digital value of thermal warning 43 when the sufficient change occurs, signaling that FPMADD has become a hot spot. A number of embodiments of the frequency difference detector version of TDC 42 are possible and all are within the spirit and scope of this invention. For example, a first counter in TDC 42 can be periodically initialized and increment at each cycle of sensor 41A (ring oscillator 1). A second counter in TDC 42 can be initialized at the same times that the first counter is initialized, and increment at each cycle of sensor 41B (ring oscillator 2). After a predetermined time following an initialization, the values of the first counter and the second counter can be compared, with the comparison determining whether ring oscillator 1 or ring oscillator 2 is of higher frequency, and how large the **frequency difference** is. When the **difference in frequency** reaches a **predetermined value**, thermal warning 43 is activated. As in the above discussion, thermal warning 43 can be stored in a register that is periodically sampled by the operating system, or can be a signal that interrupts the operating system. It will be appreciated by those

skilled in the art that thermal warning 43 could be the actual **difference in frequencies** as determined by the **frequency difference** detector embodiment of TDC 42. Embodiment of thermal warning 43 as the actual **difference in frequencies** provides the operating system (described later) with the severity of the hot spot." (emphasis added)

The currently amended independent claims 1, 10, 19, and 30 now include the limitation: "calculating an **actual temperature** of the chip as a function of the first and second ring oscillator frequencies." Support for this amendment may be found in the present specification in paragraph [0032], wherein the term "actual temperature" is used near the end of the paragraph.

Independent claims 1, 10, 19, and 30 are distinguished over Luick because the claimed "actual temperature" is not the same as Luick's "relative temperature." Luick discloses: "Sensor 41A is physically near FPMADD 18 and therefore will have a frequency that decreases **relative to** sensor 41B, which is further away, as FPMADD 18 becomes hotter." (par. 56, emphasis added) Luick does not teach or suggest determining the claimed "actual temperature" of the chip because Luick does not need to know the "actual temperature" of Luick's chip in order to accomplish Luick's intention of "eliminating hot spots." Luick determines the difference in the two frequencies (par. 0056), compares the frequency difference to a "predetermined value," (par. 0056) and then determines whether to swap a task with another processor or switch the task to another processor when the result of the comparison indicates that a local temperature is becoming too hot. (Abstract) Luick cannot determine the "actual temperature" of Luick's chip based on the frequency difference because the frequency difference only provides an indication of the temperature of one area of the chip **relative to** the temperature of another area of the chip. Therefore, the applicant respectfully submits that independent claims 1, 10, 19, and 30 are distinguished and allowable over Luick because Luick does not teach at least the claimed "actual temperature."

Regarding claims 5, 14, and 25, Luick does not teach or suggest the claimed limitations including "multiplying" the frequencies, and determining the "actual temperature" as a function of the "result" of the multiplied frequencies, as the examiner states in the Final Office Action. Luick teaches determining a **difference in frequencies**, but not "multiplying" the frequencies.

Therefore, the applicant respectfully suggests that the examiner misinterpreted Luick regarding these claims. Therefore, claims 5, 14, and 25 are distinguished and allowable over Luick because Luick does not teach at least the claimed "multiplying" limitation.

Regarding claims 6, 15, and 26, Luick does not teach or suggest the claimed limitations including "dividing" the frequencies, and determining the "process speed" as a function of the "result" of the divided frequencies, as the examiner states in the Final Office Action. Luick teaches determining a **difference in frequencies**, but not "dividing" the frequencies. Therefore, the applicant respectfully suggests that the examiner misinterpreted Luick regarding these claims. Therefore, claims 6, 15, and 26 are distinguished and allowable over Luick because Luick does not teach at least the claimed "dividing" limitation.

Note that in the present application an example of the present invention describes the "actual temperature," as claimed in claims 1, 10, 19, and 30, for example, as a temperature "estimate" based on an approximation of the equations described in paragraph 29 and the estimation described in paragraph [0032]. Further, the process speed, as claimed in claims 6, 15, and 26, is determined after the "actual temperature" is determined, as described in paragraph [0033]. Therefore, the process speed may also be an estimate. Further note that the identified process speed may be applied to adjust the previously calculated temperature estimate, as describe in paragraph [0036], for example. Therefore, claimed "actual temperature" and "process speed" are estimates that are determined as close as practically possible without using additional components or leads, as described in the present Background section in paragraph [0006].

In view of the foregoing, applicant submits that all pending claims are in condition for allowance. The applicant respectfully requests the reconsideration and reexamination of this application and the timely allowance of the pending claims. Should any issues remain unresolved, the Examiner is encouraged to telephone the undersigned at the number provided below.

If there are any other fees due in connection with the filing of the response, please charge the fees to our Deposit Account No. 17-0026. If a fee is required for an extension of time under 37 CFR 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Applicants therefore respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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